Trend Study 19B-12-02

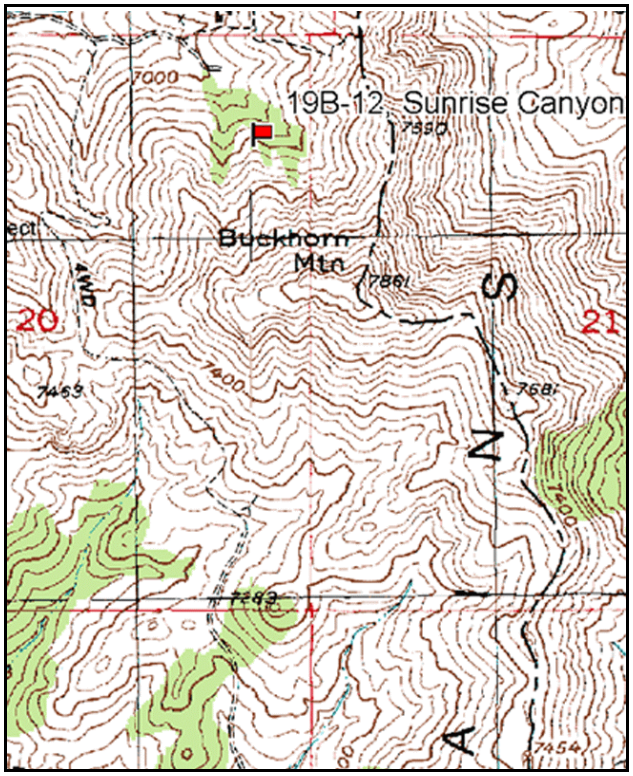
Study site name: Sunrise Canyon Vegetation type: Big Sagebrush-Grass

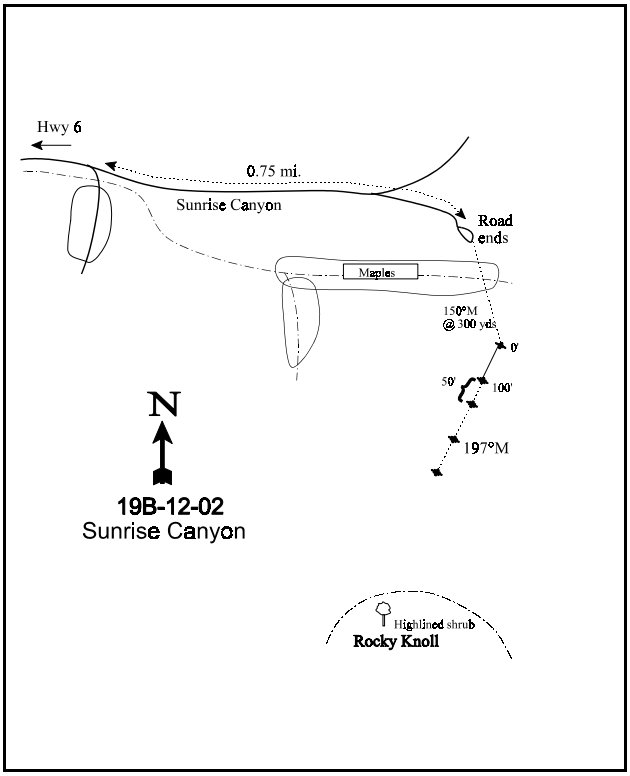
Compass bearing: frequency baseline 197 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). Rebar: belt 3 on 3ft and belt 5 on 1ft.

LOCATION DESCRIPTION

From the junction of Highway U.S. 6 and U-36, proceed south on U.S. 6 for 6.30 miles to where the Sunrise Seeding road leads off to the east at mile marker 132. Proceed east on this road for 0.70 miles to a fork. Keep left for an additional 0.90 miles to an intersection. Turn right (east) up Sunrise Canyon for 0.85 miles to another fork. Stay left and go 0.75 miles to the end of the road in the bottom of Sunrise Canyon. From this point, the 0-foot mark of the baseline is located on a small ridge on an azimuth of 171 degrees on the opposite side of a maple clogged draw. Walk on the designated azimuth through the draw to the sagebrush grass ridge. The 0-foot mark, marked by a green steel fencepost with a red browse tag #437, is located approximately midway up the slope and in the middle of the ridge.





Map Name: Tintic Mountain Diagrammatic Sketch

Township 11S , Range 2W , Section 20 GPS: NAD 27, UTM 12S 4412248 N 407341 E

DISCUSSION

Sunrise Canyon - Trend Study No. 19B-12

The Sunrise Canyon study is located on a northwest facing, moderately steep slope (25%) at an elevation of 7,200 feet. The area is deer summer range and is occupied by a sagebrush-grass type. Vegetatively, the area is typical of the higher ridges and slopes in this portion of the East Tintic Mountains. Escape and thermal cover are limited to narrow fingers of black chokecherry and bigtooth maple in the drainage bottoms. Deer favor the more mesic sites, such as this one, thus competing for succulent forage with livestock. In 1983, numerous does with fawns, as well as a brood of sage grouse, were flushed from the draw immediately below the study site. It was further noted that livestock grazing was especially intense in the draws, but much less on the slopes and ridges. In 1989, the shrub interspaces were nearly devoid of cover after spring sheep use. This is likely the case during most years. Deer pellet groups seem to be concentrated more in the chokecherry and maple bottoms below the site. A herd of sheep was grazing in the area when the site was read in 2002. A pellet group transect read on site in 2002, estimated only 7 deer days use/acre (17 ddu/ha) while domestic sheep use was estimated at 41 days use/acre (102 sdu/ha).

The soil is very shallow and rocky. Effective rooting depth is estimated at just over 7 inches with an average soil temperature of 55°F measured at 13 inches. Chemical and textural analysis indicates soils to be a sandy clay loam with a slightly acidic reactivity (pH of 6.1). Vegetative cover is moderate with over half being provided by shrubs. The slope is terraced by a network of livestock and game trails. Herbaceous vegetation cover was abundant at 27% in 2002 which adds important protective cover to the soil surface. The erosion condition class was estimated as slight in 2002.

Shrub composition is diverse but composed principally of low growing species due to the shallow, rocky nature of the soils. Sagebrush has been split into two species, low sage (*Artemisia arbuscula*) and mountain big sagebrush (*Artemisia tridentata* spp. *vaseyana*). It is likely that many of the plants are a hybrid between the two as they are known to hybridize (McArthur et al. 1979). The most abundant shrub is low sagebrush with an estimated density of 6,700 plants/acre in 1997, and 6,440 in 2002. Mature plants make up just over 80% of the population, with decadent plants representing most of the rest. The low sagebrush population has generally had good vigor except in 1989 when 60% of the population was classified as having poor vigor. Mountain big sagebrush is also present in moderately high densities, estimated at 3,000 plants/acre in 2002. Utilization is mostly light and vigor has improved since 1989. Percent decadence was moderate at 30% and 25% respectively in 1997 and 2002. With the combined densities of both sagebrush species at over 9,000 plants/acre, it is surprising that decadence and poor vigor are not higher for this browse, especially during the drought in 2002. Sagebrush should be thinned on this site to promote increased herbaceous production. Annual leader growth on sagebrush averaged less than one inch in 2002. Other browse species sampled on the site include Saskatoon serviceberry, true mountain mahogany, white-stemmed rubber rabbitbrush, slenderbush eriogonum, Oregon grape, pricklypear cactus, mountain lover, mountain snowberry, and grey horsebrush.

The herbaceous understory has been moderately low, due to the very high density and cover provided by low and mountain big sagebrush, as well as consistent spring grazing by sheep. Bluebunch wheatgrass and mutton bluegrass are the dominant grasses providing 95% of the grass cover in 2002. Both species decreased in nested frequency in 2002, but neither decline was significant. Individual grass plants that were in the open areas were grazed nearly to the ground in 2002, and identification of these particular plants was difficult.

The forb component provides a lot of cover, but composition is poor and dominated by silvery lupine which increased significantly in nested frequency and average cover in 2002. Other forbs sampled include sandwort, houndstongue, and Hood's phlox. Sum of nested frequency significantly increased in 2002 which was surprising due to drought conditions and the very dense sagebrush population. Nearly all of this increase came from the increase in silvery lupine.

1983 APPARENT TREND ASSESSMENT

Soil condition probably limits forage production on this site. The soil is thin and incapable of storing much moisture in the upper horizons. Also, the uniform shrub cover is highly competitive, thus inhibiting herbaceous understory growth. Although individual trend indicators suggest a slight decline in soil trend, the overall impression one gets is of stability, even though it is at a low level of condition. The soil surface appears almost "armored" against further erosion. The browse trend appears stable. Overall, utilization of forage is light, except for some nearby ravines, where it is quite heavy. From a management point of view, the principal problem would seem to be scarcity of cover and low production of succulent herbaceous forage.

1989 TREND ASSESSMENT

Rock and pavement still dominate the ground cover (32%). Bare ground is also moderately high at 18%. The soil trend is stable with little change since 1983. The browse trend is also stable with little change from the previous reading. Light to moderate utilization is occurring on the low sagebrush and mountain big sagebrush. Increaser species show no increase. The uncommon true mountain mahogany on the ridge above the site are extremely hedged. There is an overall decline in herbaceous understory sum of nested frequency since 1983. The herbaceous understory trend is slightly downward.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - slightly down (2)

1997 TREND ASSESSMENT

The soil trend is stable, but in poor condition. Erosion continues to occur on the site and will likely do so until livestock grazing pressures are reduced and herbaceous understory production increases. The trend for the key browse is stable. The density of low sagebrush declined, but most of this is due to the greatly increased sample size used in 1997. The proportion of the population displaying poor vigor improved for both low sage and mountain big sagebrush. The proportion of the low sage and mountain big sagebrush populations classified as decadent and dying is high at 40% and 50% respectively. However, both occur in high densities and their respective populations are probably undergoing a period of thinning with prolonged drought. Utilization decreased for both species of sagebrush compared to 1989 levels. As reported in 1989, there is still little change in the browse composition. The herbaceous understory trend is stable. The sum of nested frequency value for perennial species has declined since 1989, but only slightly. Productivity is low, possibly due to the browse canopy cover.

TREND ASSESSMENT
soil - stable, poor condition (3)
browse - stable (3)
herbaceous understory - stable (3)

2002 TREND ASSESSMENT

Trend for soil is stable. The percentage of bare ground and combined rock and pavement cover remained similar to 1997 estimates. Herbaceous cover increased due to a significant increase of silvery lupine. Slight erosion is still occurring on the site, but with the steepness of the slope, this is likely to continue. Trend for browse is stable. Low sagebrush and mountain big sagebrush remain at relatively high densities, show mostly light use, generally good vigor, and decadence is within acceptable limits. Sagebrush could be thinned on this site to promote better herbaceous production. The herbaceous understory has a stable trend with an increase in nested frequency for lupine, and only a slight decline in sum of nested frequency for perennial grasses. Composition is poor and will remain so under the current management of spring sheep grazing and the overly abundant populations of low and mountain big sagebrush.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - stable (3)

HERBACEOUS TRENDS --
Herd unit 19B, Study no: 12

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'97	'02	'83	'89	'97	'02	'97	'02
G	Agropyron spicatum	ab103	a64	b138	b116	42	33	56	55	2.02	2.60
G	Bromus tectorum (a)	-	-	15	7	-	-	8	3	.04	.01
G	Carex spp.	1	-	-	4	1	-	-	3	-	.06
G	Koeleria cristata	3	-	-	-	1	-	-	-	-	-
G	Melica bulbosa	b29	a-	a-	a3	12	-	-	1	-	.15
G	Poa fendleriana	237	254	157	131	96	107	55	51	3.25	4.26
G	Poa secunda	a7	ab23	b29	ab15	5	12	15	6	.20	.13
G	Stipa columbiana	3	8	8	-	1	3	4	-	.44	-
Total for Annual Grasses		0	0	15	7	0	0	8	3	0.04	0.01
Total for Perennial Grasses		383	349	332	269	158	155	130	116	5.92	7.22
Total for Grasses		383	349	347	276	158	155	138	119	5.97	7.23
F	Antennaria rosea	-	-	10	3	-	-	4	1	.04	.03
F	Arabis spp.	b13	ab9	ab3	a-	7	3	2	-	.01	-
F	Arenaria fendleri	b174	b153	a91	a67	65	62	38	25	1.93	1.70
F	Astragalus spp.	a-	b11	a3	ab4	-	4	2	2	.01	.03
F	Castilleja chromosa	4	-	-	-	2	-	-	-	-	-
F	Calochortus nuttallii	b6	a-	a-	a-	5	-	-	-	-	-
F	Chaenactis douglasii	2	2	-	-	1	1	-	-	-	-
F	Chenopodium spp. (a)	-	-	1	-	-	-	1	-	.00	-
F	Collomia linearis (a)	-	-	2	2	-	-	1	1	.00	.00
F	Comandra pallida	-	-	-	3	-	-	-	1	-	.00

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'97	'02	'83	'89	'97	'02	'97	'02
F	Collinsia parviflora (a)	-	-	27	20	-	-	12	7	.06	.08
F	Cynoglossum officinale	$_{a}$1	$_{a}$-	$_{b}$37	$_{b}$34	1	-	20	16	1.76	.23
F	Epilobium brachycarpum (a)	-	-	$_{a}$-	$_{b}$21	-	-	-	8	-	.04
F	Erigeron spp.	$_{b}$12	$_{c}$28	$_{a}$-	$_{ab}$3	7	15	-	2	-	.01
F	Eriogonum umbellatum	1	4	-	-	1	2	-	-	-	-
F	Galium spp.	-	-	-	3	-	-	-	1	-	.00
F	Heuchera parvifolia	3	-	-	-	1	-	-	-	-	-
F	Lactuca serriola	$_{a}$-	$_{a}$-	$_{b}$7	$_{a}$-	-	-	5	-	.02	-
F	Lithospermum ruderale	3	5	1	-	2	2	1	-	.00	-
F	Lomatium spp.	-	2	-	-	-	2	-	-	-	-
F	Lupinus argenteus	$_{a}$55	$_{b}$84	$_{c}$120	$_{d}$154	25	40	57	61	6.30	16.26
F	Machaeranthera canescens	7	7	3	3	4	3	1	2	.00	.01
F	Petradoria pumila	$_{b}$25	$_{a}$4	$_{a}$-	$_{a}$-	12	2	-	-	-	-
F	Phlox hoodii	$_{c}$91	$_{a}$16	$_{b}$47	$_{b}$55	40	6	25	25	.82	1.17
F	Phlox longifolia	-	-	-	4	-	-	-	2	-	.01
F	Polygonum douglasii (a)	-	-	$_{b}$21	$_{a}$4	-	-	10	2	.07	.01
F	Senecio integerrimus	$_{a}$-	$_{b}$11	$_{a}$-	$_{ab}$5	-	5	-	3	-	.04
F	Senecio multilobatus	-	-	2	-	-	-	1	-	.00	-
F	Taraxacum officinale	-	-	-	3	-	-	-	2	-	.01
F	Unknown forb-perennial	10	-	-	10	4	-	-	5	-	.24
F	Zigadenus paniculatus	3	8	5	-	1	4	2	-	.01	-
Total for Annual Forbs		0	0	51	47	0	0	24	18	0.14	0.14
Total for Perennial Forbs		410	344	329	351	178	151	158	148	10.93	19.78
Total for Forbs		410	344	380	398	178	151	182	166	11.08	19.93

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Herd unit 19B, Study no: 12

Type	Species	Strip Frequency '97	Strip Frequency '02	Average Cover % '97	Average Cover % '02
B	Acer grandidentatum	1	4	-	.21
B	Amelanchier alnifolia	1	0	-	-
B	Artemisia arbuscula	61	57	14.27	12.99
B	Artemisia tridentata vaseyana	48	53	10.08	15.05
B	Cercocarpus montanus	1	0	-	-
B	Chrysothamnus nauseosus albicaulis	1	2	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	36	38	1.12	2.57
B	Eriogonum microthecum	27	21	.49	.47
B	Mahonia repens	8	8	.48	.73
B	Opuntia spp.	2	4	.63	.63
B	Pachistima myrsinites	1	0	-	-
B	Symphoricarpos oreophilus	10	9	.06	.52
B	Tetradymia canescens	2	2	.03	.15
Total for Browse		199	198	27.18	33.35

CANOPY COVER -- LINE INTERCEPT
Herd unit 19B, Study no: 12

Species	Percent Cover '97	Percent Cover '02
Artemisia arbuscula	-	22.00
Artemisia tridentata vaseyana	-	21.42
Chrysothamnus nauseosus albicaulis	-	.67
Chrysothamnus viscidiflorus viscidiflorus	-	3.50
Eriogonum microthecum	-	.02
Mahonia repens	-	2.00
Opuntia spp.	-	.58
Symphoricarpos oreophilus	-	.33

Key Browse Annual Leader Growth
Herd unit 19B , Study no: 12

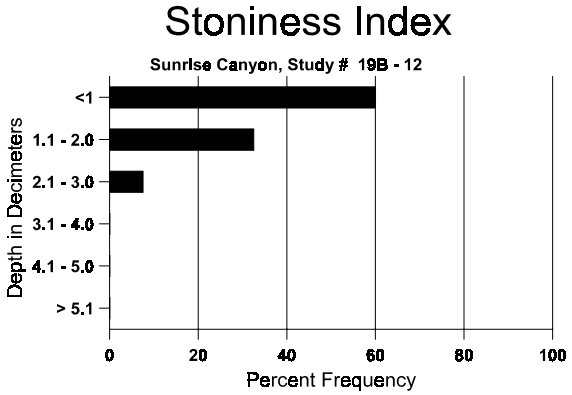
Species	Average leader growth (in) '02
Artemisia tridentata vaseyana	0.7

BASIC COVER --
Herd unit 19B, Study no: 12

Cover Type	Nested Frequency		Average Cover %			
	'97	'02	'83	'89	'97	'02
Vegetation	302	317	2.75	9.25	39.82	52.60
Rock	301	277	28.50	24.75	20.16	21.08
Pavement	267	212	4.75	7.25	7.75	7.15
Litter	384	357	48.00	40.50	39.36	24.07
Cryptogams	28	4	0	0	.16	.18
Bare Ground	218	184	16.00	18.25	13.54	14.30

SOIL ANALYSIS DATA --
Herd Unit 19B, Study no: 12, Sunrise Canyon

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
7.5	55.0 (13.0)	6.1	54.4	23.1	22.6	4.7	23.1	358.4	0.6



PELLET GROUP FREQUENCY --
Herd unit 19B, Study no: 12

Type	Quadrat Frequency	
	'97	'02
Sheep	6	13
Deer	10	4

Pellet Transect	
Pellet Groups per Acre	Days Use per Acre (ha)
02	02
539	41 (102)
87	7 (17)

BROWSE CHARACTERISTICS --
Herd unit 19B, Study no: 12

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Acer grandidentatum																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	1	-	-	1	-	-	-	20			1
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	02	4	-	-	1	-	-	-	-	-	5	-	-	-	100			5
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	
'97	00%	00%	00%	+83%
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:	
	'83	0		-
	'89	0		-
	'97	20		-
	'02	120		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier alnifolia																		
Y	83	1	-	-	-	-	-	-	-	-	-	1	-	-	66			1
	89	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	1	-	-	-	-	-	1	-	-	-	20	25	11	1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	+ 0%
'89	00%	00%	00%	-70%
'97	00%	00%	00%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:	
	'83	66		-
	'89	66		-
	'97	20		-
	'02	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia arbuscula																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	97	10	-	-	-	-	-	-	-	-	10	-	-	-	200			10
	02	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	7	4	-	-	-	-	-	-	-	5	-	6	-	733			11
	97	16	-	-	1	-	-	-	-	-	17	-	-	-	340			17
	02	9	-	-	-	-	-	-	-	-	9	-	-	-	180			9
M	83	106	-	-	-	-	-	-	-	-	106	-	-	-	7066	10	18	106
	89	50	53	-	-	-	-	-	-	-	43	1	59	-	6866	15	21	103
	97	213	60	3	-	-	-	-	-	-	259	5	12	-	5520	12	22	276
	02	224	9	27	-	-	-	-	-	-	260	-	-	-	5200	11	22	260
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	7	6	-	-	-	-	-	-	-	2	-	11	-	866			13
	97	33	8	1	-	-	-	-	-	-	23	2	-	17	840			42
	02	44	4	-	-	1	2	2	-	-	26	-	-	27	1060			53
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	360			18
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	300			15

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	+17%
'89	50%	00%	60%	-21%
'97	20%	01%	09%	- 4%
'02	04%	09%	08%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	7066	Dec:	0%
	'89	8465		10%
	'97	6700		13%
	'02	6440		16%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	97	11	-	-	-	-	-	-	-	-	11	-	-	-	220			11
	02	6	-	-	-	-	-	-	-	-	6	-	-	-	120			6
Y	83	4	-	-	-	-	-	-	-	-	3	1	-	-	266			4
	89	2	-	-	-	-	-	-	-	-	1	-	1	-	133			2
	97	6	-	-	-	-	-	-	-	-	6	-	-	-	120			6
	02	21	-	2	-	-	-	-	-	-	23	-	-	-	460			23
M	83	17	-	-	-	-	-	-	-	-	17	-	-	-	1133	24	34	17
	89	12	9	1	-	-	-	-	-	-	13	-	9	-	1466	22	32	22
	97	44	5	4	1	-	-	-	-	-	52	-	1	1	1080	26	38	54
	02	72	5	13	-	-	-	-	-	-	84	1	5	-	1800	26	39	90
D	83	3	1	-	-	-	-	-	-	-	4	-	-	-	266			4
	89	4	-	-	-	-	-	-	-	-	1	-	1	2	266			4
	97	24	2	-	-	-	-	-	-	-	11	-	2	13	520			26
	02	29	1	5	1	2	-	-	-	-	18	-	10	10	760			38
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	840			42
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	480			24

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	04%	00%	00%	+11%
'89	32%	04%	46%	- 8%
'97	08%	05%	20%	+43%
'02	05%	13%	17%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	1665	Dec:		16%
'89	1865			14%
'97	1720			30%
'02	3020			25%

Cercocarpus montanus																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	14	2	0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	
'97	00%	00%	00%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'83	0	Dec:	-
'89	0		-
'97	20		-
'02	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus nauseosus albicaulis																		
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20	38	26	1
	02	3	-	-	-	-	-	-	-	-	3	-	-	-	60	21	20	3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	
'97	00%	00%	00%	+67%
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	0	Dec:		-
'89	0			-
'97	20			-
'02	60			-

Chrysothamnus viscidiflorus viscidiflorus																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	-	-	-	-	-	-	-	-	-	-	-	-	20			1
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	11	-	-	-	-	-	-	-	-	10	-	-	1	733			11
	97	15	-	-	7	-	-	1	-	-	23	-	-	-	460			23
	02	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	83	20	-	-	-	-	-	-	-	-	20	-	-	-	1333	11	9	20
	89	9	1	-	2	-	-	-	-	-	11	-	1	-	800	5	7	12
	97	63	15	5	28	-	-	9	-	-	120	-	-	-	2400	11	11	120
	02	87	7	-	3	-	-	-	-	-	97	-	-	-	1940	11	15	97
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	02	3	-	-	-	-	-	-	-	-	2	-	-	1	60			3
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	+13%
'89	04%	00%	09%	+47%
'97	10%	03%	00%	-30%
'02	07%	00%	.98%	

Total Plants/Acre (excluding Dead & Seedlings)			
'83	1333	Dec:	0%
'89	1533		0%
'97	2900		1%
'02	2040		3%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Eriogonum microthecum																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	13	-	-	-	-	-	-	-	-	13	-	-	-	866			13
	97	4	-	-	1	-	-	-	-	-	5	-	-	-	100			5
	02	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	83	31	-	-	-	-	-	-	-	-	31	-	-	-	2066	9	8	31
	89	11	1	-	3	-	-	-	-	-	15	-	-	-	1000	7	5	15
	97	36	1	-	6	-	-	3	-	-	46	-	-	-	920	5	7	46
	02	14	1	3	2	-	-	-	-	-	20	-	-	-	400	4	8	20

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	-10%
'89	04%	00%	00%	-45%
'97	02%	00%	00%	-55%
'02	04%	13%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	2066	Dec:	-
	'89	1866		-
	'97	1020		-
	'02	460		-

Mahonia repens																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	27	-	-	3	-	-	-	-	-	30	-	-	-	600	5	7	30
	02	36	-	-	-	-	-	3	-	-	39	-	-	-	780	5	8	39

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	
'97	00%	00%	00%	+15%
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	0	Dec:	-
	'89	0		-
	'97	660		-
	'02	780		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20	9	52	1
	02	34	-	-	-	-	-	-	-	-	34	-	-	-	680	6	13	34

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	
'97	00%	00%	00%	+91%
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	0	Dec:		-
'89	0			-
'97	60			-
'02	680			-

Pachistima myrsinites																		
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	1	-	-	-	-	-	1	-	-	-	20	-	-	1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	
'97	00%	00%	00%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'83	0	Dec:	-
'89	0		-
'97	20		-
'02	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Symphoricarpos oreophilus																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	02	-	-	-	2	-	-	-	-	-	2	-	-	-	40			2
Y	83	1	1	1	-	-	-	-	-	-	1	2	-	-	200			3
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	-	-	-	-	-	1	-	-	2	-	-	-	40			2
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	1	-	-	-	-	-	1	-	-	-	66	6	2	1
	97	7	1	1	2	-	-	3	-	-	13	-	1	-	280	9	11	14
	02	7	-	-	-	-	-	-	-	-	7	-	-	-	140	18	26	7
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	-	-	-	-	-	-	-	-	-	-	1	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	33%	33%	00%	-67%
'89	00%	00%	00%	+76%
'97	07%	07%	07%	-29%
'02	00%	00%	10%	

Total Plants/Acre (excluding Dead & Seedlings)					
	'83	200	Dec:		0%
	'89	66			0%
	'97	280			0%
	'02	200			10%

Tetradymia canescens																		
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60	9	9	3
	02	2	-	-	-	-	-	-	-	-	2	-	-	-	40	10	11	2
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	-	-	-	-	-	-	-	-	-	-	1	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	
'97	00%	00%	00%	+ 0%
'02	00%	00%	33%	

Total Plants/Acre (excluding Dead & Seedlings)					
	'83	0	Dec:		0%
	'89	0			0%
	'97	60			0%
	'02	60			33%